

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/SA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/SA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/SA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2006/002881

International filing date (day/month/year)
03.08.2006

Priority date (day/month/year)
30.11.2005

International Patent Classification (IPC) or both national classification and IPC
INV. A01N31/08 A01N35/02 A01N31/16 A01N31/02 A01N35/06 A01N25/08 A01P3/00 A01P7/02
ADD. A01P5/00

Applicant
EDEN RESEARCH PLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☒ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/SA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/SA/220.

3. For further details, see notes to Form PCT/SA/220.

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this opinion

see form
PCT/SA/210

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Box No. I Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43bis.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

see separate sheet

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of

☐ the entire international application

☒ claims Nos. 49-55

because:

☒ the said international application, or the said claims Nos. 49-55 relate to the following subject matter which does not require an international search (*specify*):

see separate sheet

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

☐ no international search report has been established for the whole application or for said claims Nos.

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Searching Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13ter.1(a) or (b).

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-bis of the Administrative Instructions, and such tables were not available to the International Searching Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☒ See Supplemental Box for further details

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	26,39-44,46-48
	No: Claims	1-25,27-38,45,56-59
Inventive step (IS)	Yes: Claims	
	No: Claims	1-48,56-60
Industrial applicability (IA)	Yes: Claims	1-48,56-60
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43bis.1 and 70.10)

and /or

2. Non-written disclosures (Rules 43bis.1 and 70.9)

see form 210

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

1) Reference is made to the following documents:

- D1:** WO 2005/113128 A (EDEN RES PLC [GB]; FRANKLIN LANNY [US]; OSTROFF GARY [US]) 1 December 2005 (2005-12-01)
- D2:** WO 2005/070213 A2 (EDEN RES PLC [GB]; FRANKLIN LANNY [US]; OSTROFF GARY [US]) 4 August 2005 (2005-08-04)
- D3:** WO 03/070286 A (XIMED GROUP PLC [US]) 28 August 2003 (2003-08-28)
- D4:** WO 00/53020 A (ECOSMART TECHNOLOGIES INC [US]; BESSETTE STEVEN M [US]) 14 September 2000 (2000-09-14)
- D5:** WO 01/60163 A2 (ECOSMART TECHNOLOGIES INC [US]; BESSETTE STEVEN M [US]) 23 August 2001 (2001-08-23)
- D6:** WO 01/91555 A2 (PROCTER & GAMBLE [US]; SOUTER PHILIP FRANK [GB]; BURDIS JOHN ALLEN [GB]) 6 December 2001 (2001-12-06)
- D7:** WO 00/05964 A (ECOSMART TECHNOLOGIES INC [US]; BESSETTE STEVEN M [US]; BEIGLER MYRON) 10 February 2000 (2000-02-10)
- D8:** WO 03/051121 A2 (ECOSMART TECHNOLOGIES INC [US]) 26 June 2003 (2003-06-26)
- D9:** WO 2004/100971 A (UNIV VANDERBILT [US]; ENAN ESSAM [US]) 25 November 2004 (2004-11-25)
- D10:** WO 00/51436 A (ECOSMART TECHNOLOGIES INC [US]; BESSETTE STEVEN M [US]) 8 September 2000 (2000-09-08)
- D11:** DATABASE CAPLUS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; 1994, YOKOTA, MASA HARU ET AL: "Antimicrobial effect of aromatic natural compound, chiefly against Staphylococcus aureus" XP002265097 retrieved from STN Database accession no. 1994:453735
- D12:** DATABASE CAPLUS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; 1981, LADD, T. L., JR.: "Japanese beetle: enhancement of lures by eugenol and caproic acid" XP002407176 retrieved from STN Database accession no. 1981:401849
- D13:** DATABASE CAPLUS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; 1974, LADD, T. L., JR. ET AL: "Attraction of bumble bees and honey bees to traps baited with lures for the Japanese beetle" XP002407177 retrieved from STN Database accession no. 1974:473350
- D14:** DATABASE CAPLUS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS,

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OHIO, US; 1994, SCHMIDT, J. O.: "Attraction of reproductive honey bee swarms to artificial nests by Nasonov pheromone" XP002407178 retrieved from STN Database accession no. 1994:319812

2) The present application relates to a composition comprising a terpene component, the terpene component comprising a mixture of more than one terpene selected from the group consisting of thymol, eugenol, geraniol, and citral. The application further relates to several methods and uses involving said composition.

3) The application contains overlapping subject-matter with the copending application PCT GB 2006/002878. The Applicant's attention is drawn to the PCT Guideline ISPE 11.10.

4) Re Item II and VI

Document **D1** has been published after the priority date (30.11.2005) but before the filing date (03.08.2006) of the present application. In the case where the priority of the present application has been validly claimed, **D1** is not regarded as prior art according to Rule 64.1(b)(ii) PCT, however, in the European Procedure it will be considered as prior art for the assessment of novelty, according to Article 54(3) EPC.

5) Re Item III

Claims 49-55 relate to methods for treatment of human or animal body by therapy. Consequently, **no opinion will be formulated with respect to the subject-matter of these claims** (cf. Rule 67.1(iv) PCT and Article 34(4)(a)(i) PCT).

6) Re Item V

6.1 Novelty (Art. 33(2) PCT)

The subject-matter of claims 1-25, 27-38, 45, and 56-59 may not be regarded as novel in the light of **D2** to **D14** for the following reasons:

D2 discloses (cf. pg. 1, l. 3-7) nematicidal compositions based on a terpene component. In

a preferred embodiment, the terpene component is encapsulated into hollow glucan particles (cf. pg. 13, l. 30-pg. 14, l. 20). In particular, Example 7 shows the effect on root-knot nematodes of compositions containing between 62.5 and 500 ppm of a mixture containing **citral** and **thymol**, whereas Example 18 discloses the encapsulation of a mixture comprising **citral**, L-carvone, **eugenol**, and Tween-80 into Baker's yeast particles. The content of **D2** anticipates the subject-matter of claims 1-8, 10-25, 27-38, 45, and 59.

D3 is directed to (cf. pg. 8, l. 15-pg. 9, l. 3) the use of terpenes as microbicides. In particular, examples 8, 9, 12, 13, 17-19, and 21 disclose compositions containing **citral** and **eugenol** as bactericides, fungicides, and biofilm formation inhibitors. The disclosure of **D3** is relevant for the novelty of claims 1, 3, 5-8, 10, 20-25, 27, 30, 31, 37, and 59.

D4 shows in examples 1 and 2 the nematocidal activity of a composition comprising **eugenol**, **thymol**, trans-anethole, α -terpineol, and citronellal. These examples render the subject-matter of claims 1, 2, 4, 6-9, 20, 21, 23-25, 27, 30, 31, 37, 38, and 59 not novel.

D5 shows (cf. Example 1, composition D) the use of a composition containing the same terpenes as in **D4**, for the provision of repellency against human body lice. **D5** is thus relevant for the subject-matter of claims 1, 2, 4, 6-8, 10, 23-25, 27, 30, 31, 37, 56, 57, and 59.

The compositions IV, V, X, XII, and XV disclosed in **D6** contain a terpene component consisting of **geraniol** and **eugenol**. These compositions exhibit a good insecticidal effect (cf. pg. 18, last paragraph), in particular against aphids, whitefly, and spider mites (cf. Claim 51). In view of **D6**, the subject-matter of claims 1, 3, 5-8, 23-25, 27, 30, 31, and 56-58 is not novel.

D7 and **D8** disclose (cf. **D7**: examples 2, 17-19, and 24; **D8**: Tables 6, 12-14, 16, and 17) the insecticidal properties of a blend consisting of **eugenol**, **thymol**, trans-anethole, α -terpineol, and citronellal, against cockroaches, spider mites, Asian armyworms, and peach aphids. These documents thus anticipate the subject-matter of claims 1, 2, 4, 6-8, 10, 23-25, 27, 30, 31, 37, and 56-58.

D9 evaluates (cf. pg. 12, l. 3-9 and examples 19, 22-25, 27, 30, 31, 33, and 34) the repellent effect of compositions comprising **thymol** and **geraniol**, **geraniol** and **lemongrass oil**, or **thymol**, **geraniol**, and **lemongrass oil**, against several insects, namely mosquitos, ants, and

lice. **D9** renders the subject-matter of claims 1-7, 23-25, 27, 30, 31, and 59 not novel.

D10 relates to (cf. pg. 1, par. 1) the use of essential oils for the control of weeds. In examples 1, 2, and 7 the mixtures contain **eugenol** and **thymol**. In the light of **D10**, the subject-matter of claims 1, 2, 4, 6-8, 10, 23-25, 27, 30, and 31 is not novel.

D11 deals with (cf. abstract) the antimicrobial effects of aromatic natural compounds. In particular, a mixture containing **thymol**, **citral**, and **hinokitiol** is disclosed. Hence, the subject-matter of claims 1-6, 23, 24, 27, 31, and 37 may not be regarded as novel.

D12 and **D13** show the attractive effect of mixtures containing **eugenol** and **geraniol** for Japanese beetles (cf. **D12**, abstract) and bumble or honey bees (cf. **D13**, abstract), whereas **D14** shows (cf. **D14**, abstract) this same effect for honey bees, when compositions comprising **citral**, **geraniol**, and nerolic and geranic acids are used. The documents **D12** to **D14** are thus relevant to the novelty of the subject-matter defined in claims 1, 3, 6, 23, 27, and 31.

6.2 Inventive Step (Art. 33(3) PCT)

A reasonable examination in terms of inventive step may be carried out only for subject-matter which can be distinguished from the closest prior art. The following examination of the inventive step has therefore been restricted to the subject-matter of those claims for which novelty may be acknowledged, namely for claims 26, 39-44, and 46-48.

The compositions of Claim 26 differ from those of any of **D2** to **D14** in that they have been formulated as a dry powder. This formulation appears to constitute merely one of the obvious alternatives among which the skilled person could choose without the exercise of an inventive step, since the problem of formulating terpenes in a solid form has already been solved by e.g. **D2**, which provides examples of pelletized terpene compositions (cf. **D2**, example 18).

The methods of claims 39 to 41 differ from **D3** or **D11** in that the terpene compositions are used for the control of bacteria on plants, instead of on inert surfaces or air. However, it seems obvious that, if the compositions of **D3** exhibit a good activity against bacteria of the genus *Pseudomonas* present in the air or on hard surfaces, they will very likely be also active against bacteria of this same genus on plants.

In view of Example 9 of D3, which discloses in-vitro tests of a terpene composition against phytopathogenic fungi, it is obvious that the terpene compositions may be generally used against fungi, also on plants. The subject-matter of claims 42 and 44 may thus neither be considered to be inventive.

With regard to the particular fungi mentioned in Claim 43, the Applicant's attention is drawn to the fact that, even if the suitability of the terpene compositions claimed for the control of blight diseases on plants could probably not be foreseen from the documents cited, the tests provided in the application show that this effect is not always present for the claimed compositions (see e.g. pg. 77, l. 6-9 or pg. 96, l. 1-6). Therefore, the subject-matter of Claim 43 may not be regarded as inventive since it does not solve the problem posed for the whole scope of protection.

The ways of application claimed in claims 45 to 48 belong to those currently used in the art. As no unexpected effect seems to derive from those particular ways of application, no inventive step may be acknowledged.

Finally, the subject-matter of Claim 60 is too broad to believe that it will work for the whole scope claimed, *i.e.* for the treatment of any infection caused by microorganism, in particular, when it is considered that no tests of in-vivo activity have been carried out.

6.3 Industrial applicability (Art. 33(4) PCT)

Is acknowledged for the subject-matter of claims 1 to 48 and 56 to 60.

7) Re Item VII

The documents cited in the description do not appear to be essential to the performance of the invention as required by Article 5 PCT. Thus, the phrases on pg. 6, l. 5-7 and pg. 19, l. 27-28 should be deleted (see PCT Guidelines ISPE 4.26).

8) Re Item VIII

The following unclarities (Art. 6 PCT) should be dealt with:

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- The set of claims lacks conciseness in that the independent and the dependent claims are unduly multiplied (see also PCT Guidelines ISPE A5.42). Additionally, the description also lacks conciseness, since it relates in a large extension to methods and formulations which do not belong to those defined in the claims.
- Examples 1 to 6 and 10 fall out of the scope of the claims. This also applies to many of the compositions within the examples 7-9, 11, 13-15, 22-26, and 27.
- The relative terms "slight" and "about" used in claims 15 and 18-20 have no well-recognised meaning and leave the reader in doubt as to the meaning of the technical features to which they refer.
- Claim 17 discloses compositions, which are not possible to carry out: e.g. a composition with a content of surfactant of 99% should contain at least 1% terpene and 1% hollow glucan particles, i.e. a total of 101%. The same applies for Claim 18.
- Claim 23 refers to an "active compound" but it does not precise the kind of activity it should have.
- It is not clear if the method of Claim 42 is restricted to oomycetes or if oomycetes is mentioned as a non-limiting example of fungus.